

Geometry preAP Circle Equations

name: _____
date: _____

You've graphed **points**, $(5, 2)$; you've graphed **lines**, $y = \frac{1}{2}x - 3$; you've even graphed **parabolas** $y = x^2 + 4$. What in the WORLD does the **equation of a circle** look like, so that you can graph it?

Let's find out.

1. Open GSP.
2. In the graph menu, click on define coordinate system
3. In the graph menu, click on snap points
4. Click on the icon in your toolbar, create a circle on the grid, make some circles on the grid. Go the measure menu and find the equations of your circle.
5. Now undo all circles, so that we can explore formally. (**Ctrl + Z** until it looks like a blank grid).
6. Create 1st circle: Choose \bigcirc and click on point $(3,1)$ for your center, and $(7,1)$ for your 2nd point (one on the circle). Look to the far left of your screen and you should see an equation appeared.

Equation: _____

What is the radius length: _____ (count on your circle)

What is the circle's center: _____ (look on your circle)

Now stare at the equation and the information above, and play math detective.

7. Create your 2nd circle: Choose \bigcirc and click on center $(-8, 3)$ and circle point $(-8, 0)$.

Equation: _____

What is the radius length: _____ (count on your circle)

What is the circle's center: _____ (look on your circle)

Now stare again at the equation and your information and play math detective.

8. Create your 3rd circle: Choose \bigcirc and click on center $(-5, -4)$ and circle point $(-4, -4)$.

Equation: _____

What is the radius length: _____ (count on your circle)

What is the circle's center: _____ (look on your circle)

Now stare again at the equation and your information and play math detective.

9. Create your 4th circle: Choose \bigcirc and click on center $(9, -2)$ and circle point $(4, -2)$.

Equation: _____

What is the radius length: _____ (count on your circle)

What is the circle's center: _____ (look on your circle)

Now stare again at the equation and your information and play math detective.

10. Create your last circle: Choose \bigcirc and click on center (10, 0) and circle point (10, 6).

Equation: _____

What is the radius length: _____ (count on your circle)

What is the circle's center: _____ (look on your circle)

Now stare again at the equation and your information and play math detective.

Study the 5 "clues" you found by drawing your circles and **explain** the secret of a circle equation, what goes where and what do you look for to see important circle information (center and radius).

Practice (without using GSP to check YET).

Write the equation of a circle with the given center, C, and radius, r:

1. C(200, 5), $r = 3$ circle equation: _____

2. C(-400, 0), $r = 10$ circle equation: _____

3. C(32, -65), $r = 1$ circle equation: _____

Find the center and the radius of a circle with the following equation:

4. $(x + 28)^2 + (y - 39)^2 = 64$ center: _____ radius: _____

5. $x^2 + (y + 100)^2 = 16$ center: _____ radius: _____

6. $(x - 31)^2 + (y + 99)^2 = 5$ center: _____ radius: _____

After you BOTH are finished, check and compare your answers with a neighbor.

7. Recall the distance formula: _____
(Look it up on the Internet after you've thought about it and/or forgotten it).

8. Find the exact distance (NO DECIMALS!) between (5, 2) and (11, 4): _____

9. Using that information, write the equation of a circle with center (5, 2) that goes through point (11, 4):

_____ (Think about the radius length).

(Check with a neighbor to see if you are correct.)

10. Using your newfound knowledge from #8 and #9, write the equation of a circle with center (-3, 12) that goes through point (4, 15).

11. What if you needed to sketch a circle on graph paper? What if you knew the center and the radius?

a. What would you plot first? _____

b. Describe how you could find 4 "easy" points on your circle: _____

c. What would be your final step to drawing your circle? _____